Treatment protocol for the impaction of deciduous maxillary anterior teeth due to compound odontoma

ABSTRACT

Aim The purpose of this paper was to describe the dental and surgical management of the impaction of deciduous maxillary anterior teeth due to compound odontoma. In all analysed patients impaction of the maxillary deciduous canine was associated with the presence of an odontoma. Therefore, impaction of the maxillary deciduous canine can be considered as pathognomonic of the presence of an intraosseous odontoma. The analysis of the described cases showed that early diagnosis and early removal of the odontoma are essential in improving the prognosis of the involved teeth. Early treatment allows the impacted tooth to re-start the physiological eruption. A conservative surgical approach is advisable in order to minimise damage to the impacted teeth and preserve their normal timing and path of eruption.

Keywords Compound odontoma; Impacted deciduous teeth; Primary dentition.

Introduction

Tooth impaction is a rare anomaly in the primary dentition because the distance of tooth germs from the dental arch is very short and usually there are no obstacles to eruption [Teruhisa et al., 2009; Kramer and Williams, 1970]. Odontoma has been described like the most common aetiological factor for primary teeth impaction [Brunetto et al., 1991; Haishima et al., 1994; Yassin, 1999; Cildir et al., 2005; Yeung et al., 2003]. Compound odontomas commonly occur in the incisor-canine region of the maxilla and complex odontomas are frequently located in the premolar and molar region of both jaws [Buchner et al., 2006; De Oliveira et al., 2001; Das et al., 2002; Amado Cuesta et al., 2003; Yldirim-Oz et al., 2007; Stajicic et al., 1988].

The aim of this study was to analyse a group of patients with impacted maxillary deciduous teeth due to the presence of a compound odontoma in order to define optimal treatment protocol and treatment timing.

Subjects and methods

From a parent sample of about 3000 patients examined at the Department of Orthodontics of the University of Florence or undergoing orthodontic treatment in the period 1974-2010, 5 cases (4 females and 1 male) with impacted deciduous monoradicular teeth caused by the presence of odontomas were found. For all cases radiographic records (panoramic x-rays, intraoral radiographs, computed tomographies), dental casts and photographs were analysed.

Case 1

S.M., female, 13 years old. At the first observation in the dental arches all permanent teeth were present, with...
the exception of the right maxillary cuspid. The panoramic radiograph revealed the presence of a radiopaque neoformation and the impaction of both deciduous and permanent canines (Fig. 1). Six months later, the odontoma was removed surgically. The radiographic check six months after surgery showed no improvement in the intraosseous position of the impacted teeth (Fig. 2). After another six months, it was decided to start an orthodontic treatment to re-open the space for the permanent canine in the dental arch and to align it through surgical-orthodontic traction. During surgery a pin on the permanent cuspid was applied, but the deciduous tooth was not removed because it was located too deep into the bony structure. The comprehensive orthodontic treatment lasted 2 years and 6 months, while the orthodontic traction on the impacted canine lasted about 12 months. The panoramic x-ray at the end of the treatment showed the alignment of the upper arch with the presence in the bone structure of the impacted right deciduous canine (Fig. 3).

Case 2
F.S., female, 4 years old. At the first observation the right maxillary deciduous canine was missing. In the same day an intraoral radiograph was performed. The radiograph showed the presence of a compound odontoma in the anterior part of maxilla on the right side. This lesion determined the impaction of the right deciduous canine. The patient’s parents refused the proposed surgical treatment to remove the odontogenic lesion. The patient returned at our observation at the age of 16 years and in the upper arch she showed the lack of the right permanent canine and a space between the first premolar and the lateral incisor. The panoramic radiograph confirmed the presence of the odontoma previously diagnosed and the impaction of both the deciduous and permanent canines (Fig. 4). The compound odontoma was surgically removed with both teeth (Fig. 5) since it was impossible to align the permanent canine by orthodontic traction.

Case 3
R.L., male, 5 years old. At the first observation the maxillary right deciduous canine was missing. The intraoral and panoramic radiographs showed the aplasia of a lower incisor and the presence of an odontoma of limited size in the area of the upper right canine.
The deciduous tooth was impacted and very close to the neoformation (Fig. 6). A surgical intervention was carried out to remove both the odontoma and the deciduous canine (Fig. 7). After three years, the upper left deciduous cusp was extracted to facilitate the eruption of the maxillary left permanent canine that was located deep in the bony structure. At the same time the patient began the orthodontic therapy but the patient discontinued it before the end.

**Case 4**

L.L. 3 years and six months old, female. At the first observation the maxillary right deciduous canine was missing (Fig. 8). The panoramic radiograph showed the presence of a large compound odontoma in the right premaxilla. The odontogenic lesion had caused impaction of the maxillary right deciduous canine, the dislocation of the permanent canine germ deep into the bone structure and the distal dislocation of the germ of the right first premolar (Fig. 9).

During surgery it was decided to remove only the odontoma, so that the surgical procedure was less invasive. Two years after surgery the deciduous canine erupted spontaneously (Fig. 10). The panoramic radiograph showed an improved intraosseous position of the maxillary right permanent canine but the first premolar was still distally displaced (Fig. 11). After two years the panoramic x-rays showed normal eruption of the permanent canine with an improvement in the intraosseous position of both the first and second premolars. A follow-up 10 years after eruption of the deciduous canine showed a perfect alignment of all the permanent teeth (Fig. 12).

**Case 5**

D.S.R., female, 6 years. At the first observation the maxillary right deciduous lateral incisor was missing. The panoramic radiograph showed the presence of a large compound odontoma in the right premaxilla. The odontogenic lesion had caused the impaction of the maxillary right deciduous lateral incisor and the dislocation of the permanent lateral incisor germ in a very unfavourable position compared to the contralateral tooth (Fig. 13, 14). Six months after the first visit a computed tomography was performed to locate...
more accurately the lesion and to facilitate the surgical approach to remove the odontoma and the deciduous impacted tooth. An intraoral radiograph was taken every six months to follow-up the lesion. The first post-surgery radiograph showed a residual part of odontoma.

After 2 years the patient underwent a second surgical procedure to remove the residual odontoma that prevented the eruption of the upper right permanent lateral incisor. The subsequent radiographs showed a significant improvement in the position of the permanent lateral incisor (Fig. 15).

The patient underwent orthodontic treatment to open the space in the arch for the upper right lateral incisor. This tooth erupted spontaneously nearly two years after surgery (Fig. 16). Then, after two and a half years, the maxillary right deciduous canine was extracted to facilitate the eruption of the permanent canine.

**Results**

The findings of the present study are reported in the Table. All subjects were affected by the impaction of deciduous maxillary anterior teeth due to compound odontoma. In four out of five cases the compound odontoma was localised on the right side of the maxilla and it caused the impaction of the right deciduous maxillary canine. The early diagnosis and surgical removal of the odontoma (3.5 years to 6.5 years) allowed for the spontaneous eruption of the permanent teeth in two cases (Case 3 and 5) while in one case both the deciduous and permanent canines erupted spontaneously (Case 4). When the diagnosis of compound odontoma was performed at a later developmental stage (13.3 years to 16.2 years) the surgical removal of the lesion in one case (Case 2) was accompanied by the extraction of the impacted deciduous and permanent canines while in the other case (Case 1) the impacted permanent canine was guided in the arch with surgical exposure and orthodontic traction.

**Discussion**

The analysis of the cases reported in this study, although numerically small, confirmed that when a deciduous maxillary canine is missing in the arch without apparent cause, almost certainly it is impacted since the aplasia of a primary canine is very uncommon [Clayton,
TOOTH IMPACTION CAUSED BY COMPOUND ODONTOMA

1956; Baccetti, 1999; Ranta R. 1983; Cho and Lee, 2006]. The present study showed that the association between the impaction of the deciduous canine and the presence of an odontoma was systematic, as indeed reported by other authors [Yildirim-Oz G. et al 2007; Ranta R. 1983]. Therefore, the impaction of the maxillary deciduous canine can be considered as pathognomonic of the presence of an intraosseous odontoma.

The peculiar feature of this paper was to describe 5 cases with the same therapeutic approach for the treatment of impacted monoradicular teeth due to the presence of a compound odontoma (Table). In all cases the anomaly was localised in the upper arch on the right side. In 4 cases the impacted tooth was a deciduous canine and only in one case it was a deciduous lateral incisor. Two cases also showed impaction of the permanent canine. In all cases the initial approach was the surgical removal of the lesion. In three cases it was necessary to remove the impacted deciduous tooth together with the odontoma while in one case even the permanent canine had to be extracted because its position into the bone structure was unfavourable.

The patient’s age at the time of the surgical approach was crucial for the prognosis of the permanent tooth: in fact, the two cases treated at a later stage were the only ones in which the permanent tooth did not erupt spontaneously. In Case 1 surgical-orthodontic traction was required to align the impacted canine in the arch, while in Case 2 it was necessary also to remove surgically the permanent tooth. The present study showed that in cases treated early the prognosis was more favourable: in two cases there was the spontaneous eruption of the permanent tooth while in one case both the deciduous and permanent canines erupted spontaneously.

Table 1: Summary table of reported cases.

<table>
<thead>
<tr>
<th>Cases</th>
<th>Age</th>
<th>Sex</th>
<th>Histology</th>
<th>Dental Anomalies</th>
<th>Treatment</th>
<th>Deciduous Tooth Prognosis</th>
<th>Permanent Tooth Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 S.M.</td>
<td>13y4m</td>
<td>F</td>
<td>CO</td>
<td>Impaction of 5.3 and 1.3</td>
<td>Surgical resection of lesion</td>
<td>Impaction into the bone structure</td>
<td>Surgical-orthodontic traction</td>
</tr>
<tr>
<td>2 F.S.</td>
<td>16y3m</td>
<td>F</td>
<td>CO</td>
<td>Impaction of 5.3 and 1.3</td>
<td>Surgical resection of lesion</td>
<td>Surgical removal</td>
<td>Surgical removal</td>
</tr>
<tr>
<td>3 R.L.</td>
<td>5y10m</td>
<td>M</td>
<td>CO</td>
<td>Impaction of 5.3</td>
<td>Surgical removal</td>
<td>Spontaneous eruption</td>
<td>Spontaneous eruption</td>
</tr>
<tr>
<td>4 L.L.</td>
<td>3y6m</td>
<td>F</td>
<td>CO</td>
<td>Impaction of 5.3</td>
<td>Surgical removal</td>
<td>Spontaneous eruption</td>
<td>Spontaneous eruption</td>
</tr>
<tr>
<td>5 D.S.R.</td>
<td>6y6m</td>
<td>F</td>
<td>CO</td>
<td>Impaction of 5.2</td>
<td>Surgical resection of lesion</td>
<td>Surgical removal</td>
<td>Spontaneous eruption</td>
</tr>
</tbody>
</table>

Conclusion

The analysis of the described cases shows that early diagnosis and early removal of the odontoma are essential in improving the prognosis of the involved teeth. Early removal of the odontoma allows the impacted tooth to re-start the physiological eruption. A conservative surgical approach is advisable in order to minimise damage to the impacted teeth and preserve their normal timing and path of eruption.

References